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AN EVALUATION OF THREE YEAR LOSS OF LOBLOLLY PINE
TO ANNOSUS ROOT ROT FOLLOWING THINNING

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An Evaluation of Three Year Loss of Loblolly Pine
to Annosus Root Rot following Thinning

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ABSTRACT

Measurements made two and three years after thinning a loblolly pine plantation in east central Mississippi are interpreted. Loss to mortality resulting from annosus root rot were severe; 25% of the residual stand has died. Current growth of 1.78 cords per acre was completely offset by the three year mortality loss of 1.9 cords/acre. Current stocking was found to be 178 trees/ac.

During 1977 a summer thinning was done in part of a 29 acre loblolly pine plantation located approximately 5 miles north of Aberdeen, MS. Subsequently the stand became heavily infested with Heterobasidion annosum (Fr.) Bref.

In response to a call from the land managers, Dick Collins (Mississippi Forestry Commission) and personnel from the Pineville Field Office, Forest Pest Management initiated an evaluation of damage resulting from the annosus infection.

Materials and Methods

In November 1979 field crews established eight 1/5 acre plots within the thinned portion of the loblolly pine plantation.

Within these plots all standing green trees were marked and counted. All dead trees in the plot were also tallied.

Ten green trees within each plot were measured for height (to a 4" top) and D.B.H. The measurements were tallied and later converted to individual tree volumes using a Form Class 70-74 volume table.

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Results

Despite the presence of root rot an increase in volume was seen (Table 1) on all plots (except Plot 1) in 1980.

It should be noted that only two trees died on Plot 1. The difference in observed volume is apparently a sampling discrepancy and does not reflect true loss of volume on the site.

Mean volume over all plots shows a .01 cord/tree increase during the 1980 growing season.

In comparing green tree counts for 1979 and 1980 a slight decrease in the number of merchantable trees (Table 2) was found. Mortality occurred during the 1980 growing season on six of the eight plots, while eight trees on four of the plots entered the merchantable category (very few non-merchantable stems still remain living on the plots).

The number of merchantable stems on the plots (including 8 new ones) declined from 311 to 306, a net loss of five stems. The actual 1 year mortality was 13 stems as reflected in the data for "Dead" (Table 2).

Data collected on Plot 1 will be excluded from further discussion as a check on the dimensions of that plot showed it to be larger than the 1/5 acre desired size.

Discussion

Using the average tree volume as a basis $[(67 \text{ trees} \times .085 \text{ cds/tree} + 11 \times .095 \text{ cds/tree}) \frac{5 \text{ plots/ac}}{7 \text{ plots}} =] 4.8 \text{ cds/acre}$ have been lost in the 3 years since thinning. This estimate is high.

The trees seen dead were generally either co-dominants or suppressed. A sample of four of the thirteen trees which died during the 1980 growing season indicated an average tree volume of only .034 cords per tree as contrasted to the .095 cords/tree of the living trees. If we use this value and apply it to the 78 trees dead on Plots 2-8 we find $(78 \times .034 \times 5/7 =) 1.9 \text{ cords per acre loss through three years}$. This number still a high estimate of loss resulting from mortality since it applies data for trees growing for at least 2 1/2 years from thinning to those which died in shorter periods of time).

While loss due to mortality has been estimated high by these computations overall loss is underestimated. Unevaluated loss resulting from loss of growth by declining, green trees was probably occurring on this site.

Considering the data from plots 2-8 an average plot contained 35.5 green and 9.6 dead trees or 225 stems/acre after thinning. However, since 48 trees/acre are dead, there is actually a residual stand of only 178 live stems/acre. This is marginal stocking for loblolly pine. A stand with

≤ 150 trees/acre is inadequately stocked and a "salvage" recommendation is generally made; > 300 trees/acre is adequate and generally carried to rotation.)

Interpretation of the data suggests that the rate of annosus-caused mortality declined this past year (91 trees in just 2 years and only 13 trees during the 3rd year). However, there were many thin crowned trees in the green class, suggesting a high incidence of root rot still affecting the stand. Unfortunately, no data were collected to document green trees with H. annosum fruiting or obviously thin crowns.

Current stocking level is extremely close to the lower end of the "marginal" zone, and there is high visibility of affected but still green trees on the site. If no other management considerations beyond timber are relevant (eg. camping or hunting on the property) cutting the residual stand and regenerating the area is the recommended management alternative.

After clear cut and during the first 3-5 years after planting you should expect about 5% loss of seedlings to annosus root rot. Planting density should be kept lower than "normal" for this area; about 500 (8 x 10 = 544/acre.) seedlings per acre is recommended.

Table 1. Projected average tree volumes for each plot (based on 10 tree samples).

	Average Volume (Cords/tree)	
	1979	1980
Plot 1	.115	.077
2	.079	.079
3	.085	.109
4	.103	.123
5	.071	.072
6	.085	.094
7	.054	.072
8	.085	.103
Average	.085	.095

Table 2. Number of living and dead loblolly pine trees on the eight evaluation plots, 1979 and 1980.

	Green		Dead	
	1979	1980	1979	1980
Plot 1	62	60	24	26
2	48	45	20	25
3	41	40	8	9
4	25	23	7	9
5	35	38	7	7
6	30	29	4	5
7	39	38	8	10
8	31	33	13	13
TOT	311	306	91	104
%	77.4	74.6	22.6	25.4